

Message Text

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ACTION NASA-04

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E.O. 11652: DECLASSIFY UPON RECEIPT

TAGE: TSPA

SUBJECT: IMAGE ANALYSIS

DEPT PASS FOLLOWING FROM N.H. MACLEOD, AMERICAN UNIVERSITY, TO:

DR. STANLEY FREDEN, CODE 650 , GODDARD SPACE FLIGHT CENTER (NASA)
GREENBELT, MD AND
DEAN R. BOYNTON
AMERICAN UNIVERSITY
WASHINGTON, D.C.

A. REPORT ON IMAGE ANALYSIS FOLLOWS:

1. SPACE AIMAGERY USED FOR THIS STUDY INCLUDE ERTS-1 NSS IMAGES
1235-09370, 1289-09371, 1289-09362, 1325-09362, 1325-09365, IN
THE FORM OF DIAZO COLOR COMPOSITION. IMAGE PROCESSING AND
PRELIMINARY INTERPRETATIONS WERE PERFORMED BY THE DROUGHT
ANALYSIS LABORATORY, A COOPERATIVE PROGRAM OF THE AMERICAN
UNIVERSITY, THE CATHOLIC UNIVERSITY OF AMERICA AND THE NASA
GODDARD SPACE FLIGHT CENTER IN GREENBELT,
MD, U.S.A. A MOSAIC OF 12 ERTS-1 IMAGES AND AN ONC TRANS-
PARENT OVERLAY WERE ALSO USED FOR THIS STUDY.

2. ERTS-1 SPACE IMAGERY (NSS) OF THE SAHELIAN ZONE HAVE
INDICATED THE PRESENCE OF PERSISTENT SOIL MOISTURE AT LATITUDES
NEAR THE 16TH PARALLEL (FORTH) AND BETWEEN 3 AND 7 DEGREES EAST
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(3-7 E). THIS REGION RECEIVES LESS THAN 400 MM OF RAIN DURING

THE MONTHS FROM JULY TO SEPTEMBER. IMAGERY TAKEN ON 13 JUNE 73, NINE MONTHS AFTER THE LAST RAINS OF THE PREVIOUS SEASON, INDICATE SOIL MOISTURE IS STILL PRESENT NEAR THE SURFACE.

A JOINT MISSION FROM THE TECHNICAL STAFF OF THE REPUBLIC OF NIGER AND THE AMERICAN UNIVERSITY (WASHINGTON,D.C.) CONDUCTED AERIAL AND SURFACE EXAMINATION OF THE REGION TO DETERMINE THE NATURE OF THIS PHENOMENON AND TO MAKE RECOMMENDATIONS CONCERNING THE DEVELOPMENT AND USE OF THESE RESOURCES.

3. A TEAM WAS FORMED TO CONDUCT FIELD STUDIES TO EXAMINE THE HYPOTHESIS DIRECTLY. THE TEAM MEMBERS WERE:

DR. GARBA ZAKARY, DIRECTION OF AGRICULTURE
DR. HASSAN ABDOU, DIRECTION OF HYDROLOGY
DR. NORMAN H. MACLEOD, THE AMERICAN UNIVERSITY
DR. DARRELL RANDALL, THE AMERICAN UNIVERSITY

TWO FIELD MISSIONS WERE CONDUCTED: FIRST ON THE SURFACE (BY LAND ROVER) TO ABALA, CERCLE DE FILINGUE AND THE EKRAFANE RANCH (AUGUST 15, 16, 17) AND SECOND, AN AERIAL AND SURFACE SURVEY (AUGUST 20,21,22,23). THE AERIAL SURVEY WAS DONE BY HELICOPTER, AS ALOVETTE II, SUPPLIED BY THE REPUBLIC OF IVORY COAST FOR THIS MISSION, THROUGH THE GOOD OFFICES OF PRESIDENT DIORI.

4. CONCLUSIONS

A. THE EKRAFANE RANCH DEMONSTRATES THE FEASIBILITY AND USEFULNESS OF CONTROLLED GRAZING MANAGEMENT IN THE SAHELIAN ZONE. BENEFITS FROM IMPROVED PRACTICES ARE FAR MORE PROFOUND IN TERMS OF REVERSAL OF DESERTIFICATION THAN SIMPLY RATIONALIZED LIVESTOCK PRODUCTION IN THE ZONE. IMPROVEMENT OF WATER, SOIL AND VEGETATION RESOURCE IS QUITE APPARENT EVEN AFTER ONLY FIVE YEARS OF ENCLOSURE (CLOTURE).

B. LARGE RESERVES OF NEAR-SURFACE WATER, ANNUALLY REPLENISHED, EXIST WITHIN THE CHANNELS OF THE EXTENSIVE ANCIENT DRAINAGE SYSTEMS IDENTIFIED IN THE ERTS-1 IMAGERY. A VERY SMALL PART OF THIS WATER IS BEING USED, BY PUMPAGE, FOR LIVESTOCK AND HUMAN WATER SUPPLIES--NONE FOR IRRIGATION.

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C. THERE ARE LARGE AREAS OF EXCELLENT SOILS IN THE CHANNELS, WHOSE LOCATION IS EASILY FOUND THROUGH ANALYSIS OF SPACE IMAGERY. THE SOILS ARE SUEFUL FOR IRRIGATED CROP PRODUCTION WITH WATER SUPPLIED BY PUMPAGE.

D. SOIL NOW USED IN TRADITIONAL AGRICULTURE IS BADLY ERODED (SHEET EROSION), IN MANY CASES TO THE POINT OF BEING UNECONOMIC FOR FURTHER PRODUCTION. MOST OF THE AREAS USED IN

UNCONTROLLED GRAZING ARE SIMILARLY AFFLICTED BY EROSION--WIND
EROSION IN THIS CASE. WHILE TRADITIONAL AGRICULTURE HAS ENABLED
NIGER TO EXPORT AGRICULTURAL COMMODITIES IN THE PAST, ITS
UNMODIFIED CONTINUATION IN THE REGION WE EXAMINED CAN ONLY LEAD
TO FURTHER DETERIORATION OF PRODUCTIVITY AND ALSO TO THE
DETERIORATION OF THE AGRICULTURAL RESOURCE BASE.

B. COMPLETE REPORT FOLLOWS RETURN WASHINGTON THURSDAY,
AUGUST 30.R

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